Department of Planning and Development

CAM Client Assistance Memo 406

Seattle Permits

— part of a multi-departmental City of Seattle series on getting a permit

Outdoor Air Quality in the Puget Sound Area and the Implications for Building Ventilation Systems

December 1995

Overview

The Seattle and Washington State Energy Codes specify minimum outdoor air quantities to be used for the design of ventilation systems for comfort and health. These quantities are based on ASHRAE Standard 62-1989. A key presumption is that the outdoor air is of sufficiently good quality so that introducing it to the building would improve the indoor air quality. There are times when the outdoor air does not meet national standards. Careful location of outdoor air intakes, the use of filtering systems and the time of operation of ventilation systems are ways to improve the quality of outdoor air introduced into the building.

Outdoor Air Quality in Puget Sound

The U.S. Environmental Protection Agency (EPA) has set national standards for six air pollutants: carbon monoxide, particulate matter (PM_{10}), ozone, sulfur dioxide, lead and nitrogen dioxide. Concentrations of these pollutants are measured locally by the Puget Sound Clean Air Agency (PSCAA) and the State Department of Ecology. PSCAA publishes an annual summary of measurements for the Counties of King, Kitsap, Pierce and Snohomish. The Air Quality Data Summary is available from PSCAA at 110 Union Street, Suite 500, Seattle, Washington 98101.

The 1993 Air Quality Data Summary indicates that the Puget Sound region is in attainment (meets) all of the standards for sulfur dioxide, lead and nitrogen dioxide. As of November 1995, much of the central Puget Sound Region, including all of Seattle, was still officially designated nonattainment for carbon monoxide and ozone. The Central Kent area, Seattle-Duwamish Industrial area and Tacoma Tideflats Industrial area were still officially designated nonattainment for particulates. For both carbon monoxide and particulates, the standards for eight-hour or twenty-four hour limits are exceeded less than 10 days per year. In none of the areas are standards continually exceeded day after day. The boundaries of the particulate non-attainment areas are attached.

While there is no requirement that the outdoor air be treated, there are steps that designers, building owners and tenants might take to improve the quality of the outdoor air being introduced into the building. The key options are location of the outdoor air intake, the use of filtering systems and the time of operation of ventilation systems.

Location of Outdoor Air Intakes

The key source of carbon monoxide is automobile exhaust. The particulate non-attainment area is located below the 100 foot elevation contour. Consequently, locating outdoor air intakes away from streets and as high as possible above the ground is a logical first step in minimizing potential problems.

ASHRAE Standard 62-1989 recommends that contaminants from cooling towers, sanitary vents, vehicular exhaust from parking garages, loading docks and street traffic be avoided. While this can be done to some extent by the location of outdoor air intakes, it warns that there can be problems in buildings where the stack effect draws contaminants from these areas into the occupant spaces. ASHRAE Standard 62-1989 is available from ASHRAE at 1791 Tullie Circle N.E., Atlanta, GA 30329. (404-636-8400).

When both outdoor air intake and various exhausts are located on the roof, it may be difficult to totally prevent exhausted air from being drawn back into the building all the time. Options include facing the intake away from the exhaust or having the intake positioned horizontally while the exhausts be vertical and project above the level of the intake. Still there

may be problems. Prevailing winds vary at different times of the year and with different weather conditions. Local wind patterns vary depending on building design and location and size of adjacent buildings.

Filtering Systems

Filtering systems for particulates are well known and understood. Besides improving air quality, some owners also install filters to reduce dirt and soot buildup on ceilings and walls. This allows less frequent interior painting and thus saves on maintenance costs. Of course filters do need to be cleaned and/or replaced regularly to function effectively. In addition, the filters create a higher static pressure, thereby increasing energy consumption.

Filtering for carbon monoxide gas and ozone is much more problematic. There are no inexpensive approaches. The best choice is careful placement of outdoor air intake.

Time of Operation of Ventilation Systems

Outdoor air quality is usually better in the very early morning hours. On days when air quality is bad some building managers operate the ventilation system to flush the building with outside air from 3 a.m. to 5 a.m.

Questions?

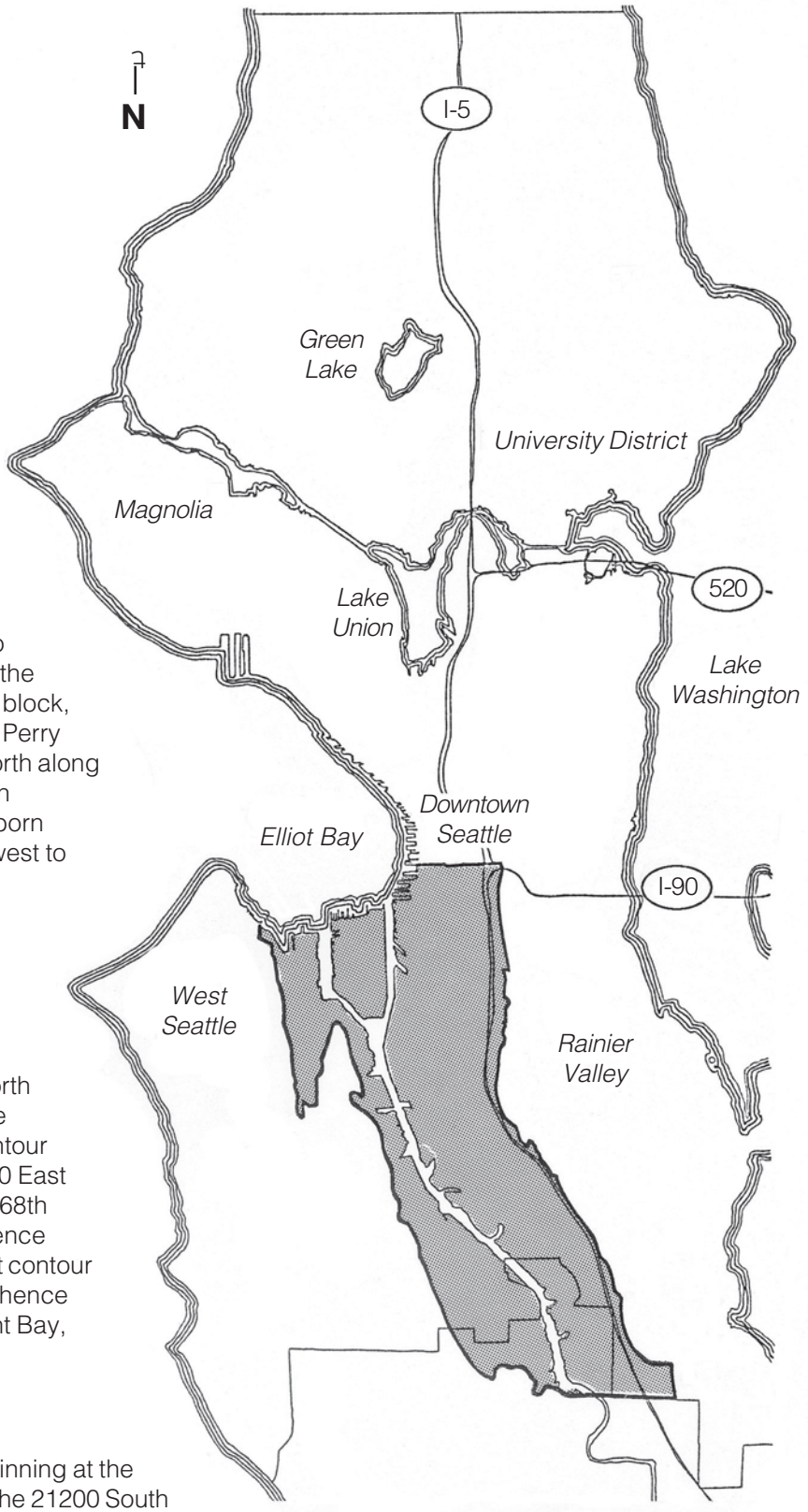
For projects within the Seattle City Limits, if you need further information on Energy Code requirements and the compliance process, contact the Seattle Department of Planning and Development's (DPD) Energy Code Technical Support line, (206) 684-7846. Technical support is available 1:00 p.m.-4:15 p.m., Monday-Friday.

You may also visit the DPD Applicant Services Center, located on the 20th floor of Seattle Municipal Tower at 700 Fifth Ave. in downtown Seattle, (206) 684-8850.

Access to Information

Links to electronic versions of DPD **Client Assistance Memos (CAMs), Director's Rules**, and the **Seattle Municipal Code** are available on the "Publications" and "Codes" pages of our website at **www.seattle.gov/dpd.** Paper copies of these documents, as well as additional regulations mentioned in this CAM, are available from our Public Resource Center, located on the 20th floor of Seattle Municipal Tower at 700 Fifth Ave. in downtown Seattle, (206) 684-8467.

Outdoor Air Quality Particulate Matter Non-Attainment Areas



Seattle - Duwamish Valley

The area of King County within the bounds beginning at the intersection of Fairmont Avenue Southwest (3600 Southwest block) and Elliott Bay extending south along Fairmont Avenue Southwest to the 100 foot height contour, thence south along the meandering 100 foot height contour to South 104th Street (10400 South block), thence east along South 104th Street (10400 South block) to the 100 foot height contour, thence north along the meandering 100 foot contour to the 9700 South block, thence west along the 9700 South block (South Perry Street) to the 100 foot height contour, thence north along the meandering 100 foot height contour to South Dearborn Street, thence west along South Dearborn Street (800 South block) to Elliott Bay, thence west to point of beginning.

Tacoma Tideflats

The area of Pierce County within the bounds beginning at the intersection of the North 100 block and Commencement Bay (near Stadium High School) extending southwest along the North 100 block to the 100 foot height contour, thence south along the meandering 100 foot height contour to Interstate 5, thence east along I-5 to the 6800 East block, thence north along the 6800 East block (68th Avenue East) to the 100 foot height contour, thence northwest along the meandering 100 foot height contour to the Tacoma City limits (near Brown's Point), thence along the Tacoma City limits to Commencement Bay, thence south to the point of beginning.

Kent/Green River Valley

The area of King County within the bounds beginning at the intersection of the 100 foot height contour and the 21200 South block extending south along the meandering 100 foot height contour to Highway 516, thence east along Highway 516 (Willis Street) to the 100 foot height contour, thence north along the meandering 100 foot height contour to South 212th Street (21200 South block), thence west along South 212th Street (21200 South block) to the 100 foot height contour (point of beginning).